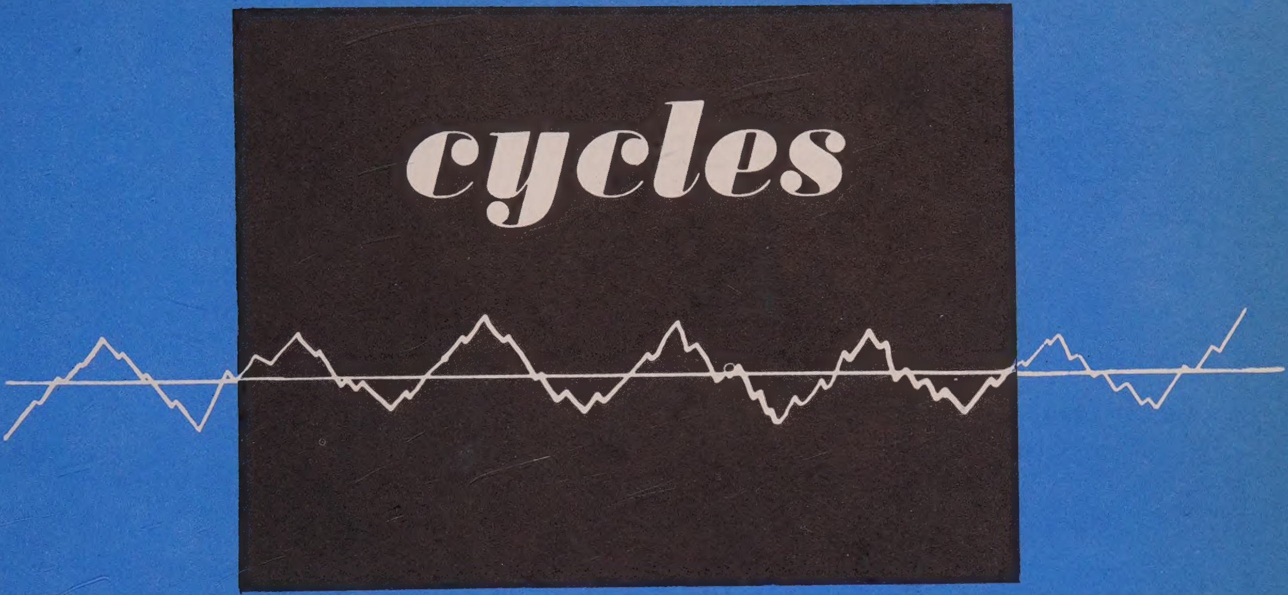

# cycles

December 1954

FOUNDATION FOR THE STUDY OF CYCLES
New York, New York

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cycles

The official Bulletin of the Foundation for the Study of Cycles

VOLUME V NUMBER 10 DECEMBER 1954

# The Director's Letter

Good Morning!

I am writing you this letter as I ride the train from New York City back to my Western Pennsylvania hideout. I am bursting with things to tell you about my latest four day visit to New York. However, I shall limit myself to five topics: (1) an endowment for the Foundation, (2) the Membership Plan, (3) some cycle discoveries, (4) some new techniques, and (5) the cause of at least some of the cycles.

### *An Endowment for the Foundation*

By way of background let me say that the Foundation has no endowment.

When we were organized, in 1940, our Chairman gave us $500 to start us going. We had to use this money for operating expenses. I have always been sorry. It would have been fun to say, over the years, "Yes, we have an endowment. It amounts to $500. We have the interest and, if necessary, we may dip into the principal!"

Well, to get on with the story: A month ago when I was in New York to attend a meeting of the Forecasters' Club, a Mr. J. B. Anonymous telephoned to ask me to luncheon. At luncheon he said, "I think the Foundation is doing a perfectly wonderful job. It grieves me that you have no money with which to do the many things that need to be done. Could I have your permission to try to raise for you, as a labor of love, an endowment of $100,000?"

As you can imagine, after they had brought me to, I said "Yes."

And so it came about that an Endowment Fund has been established--even though as yet it is merely a great yawning emptiness waiting to be filled. Mr. Anonymous has been made Vice President in charge of Filling.

He reported to me last Sunday that he was ready to go. In fact he said that a friend had already promised the first thousand!

An endowment for the Foundation would be a miracle. Miracles do not often happen. But they do happen sometimes. And the fact that the sales organization which Mr. Anonymous heads sells $12,500,000 a year of a certain product offers hope that he may be able to do what he plans. I bespeak your cooperation if he should ask you for advice or assistance. Even Mr. Anonymous can't do this job all by himself.

### *Membership*

For the first time that I can recall the Membership Division has all its bills paid and has money in the bank!

Of course this is only a fictitious surplus because the Membership Division is not yet charged any of the cost of preparing the monthly report (it couldn't stand the burden). However, even a fictitious surplus is better than *no* surplus.

The cost of preparing the report is met from profit on research fees. We make a profit on work of that sort because I work for the fun of it, and turn what is paid for my services over to the Foundation.

Membership stays steady at about 4,200. New members come in just about fast enough to offset the members we lose. We lose members from death, moving without leaving a forwarding address, and resignation. We also have to drop a certain number of members for nonpayment of dues.

To be on a fully self-sustaining basis we need a minimum of 5,000 members. If every member got a friend....! But that is too much to hope for. However, if you want to give *Cycles* for Christmas we have made it as easy for you as we can. Just fill in and mail the card bound into this report. It will help a lot. Only, please do it *now* while you think of it.

We lose money on the member who joins for one year and fails to continue. But we are glad to get new members notwithstanding because so many do continue. And the law of averages works in our favor.

In order to serve you better, we are planning to querry you regarding your industry, the nature of your own work, and your special interest in the subject of cycles. When you get the request please answer promptly. Also, if you care to supplement your reply with additional comment in regard to what you like or dislike about the monthly reports, it will be very helpful. After all, it is *your* Foundation.

### *New Techniques*

And now to get back to the subject of cycles:

Most of the cycles I have told you about from time to time are pictured as if they were, ideally, rigid cycles of uniform length, strength, and shape.

For example the weatherman, when he charts the average yearly temperature cycle, pictures it as exactly 12 months long and with fixed normal values for every day in the year. I do the same for you when I idealize the 5.91-year cycle in cotton prices or the 41-month cycle in automobile production.

Of course the *actual* cycle varies from the *ideal*. At one time the interval from coldest day to coldest day may be 13 months. But, if so, we know that sooner or later an 11-month interval will come along to true the *apparent* year up to the *true* year. We know this for two reasons: one, we have enough repetitions of the cycle to see that it always does average 12 months. That is, we can compare the behavior of one one hundred year sample, let us say, with the behavior for another one hundred year sample. And two, we know the *cause* of the cycle of the year—namely the time required by the earth to go once around the sun.

Now with many other cycles we do *not* know that the basic cause is uniform, either in length or in strength. For example, a cycle in sunspots *caused* in some way by successive interrelations of the planets Jupiter and Uranus would vary in length from 9.6 years to 13.5 years. This would not be accidental variations, as with the yearly weather cycle, but would be in the very nature of things. This is so because of the shape of the orbits and the rates of the motions of the planets involved.

However, if you did not know all this, you might *represent* this irregular cycle as a perfectly *regular* cycle of *average* length in order to deal with it and to project it.

Then you might find that the irregularities were more or less regular. You would then perhaps postulate another cycle to describe the irregularities. Thus you might go on and on, piling cycle on cycle, in patterns of ever increasing complexity.

Now you don't *have* to do this. There are ways of dealing with cycles of irregular length and shape. (See the report for November 1950 for a study which shows that from 1770 to 1946 the so called 40-month cycle in general business has changed progressively from 34 10/11 to 36 6/11 to 39 4/11 to 40 8/10 months in length.) However, the methods I have known of up to now leave much to be desired. It was therefore with a genuine thrill that I learned, last Saturday morning, of additional techniques for dealing with this knotty problem.

My teacher was Abraham Streiff, a jovial consulting engineer of New York City. Mr. Streiff has been studying cycles for 37 years (as against my 17).

Mr. Streiff's story is an interesting one. Many years ago he and another engineer were engaged to build a huge dam for a hydro-electric project in Wisconsin, I think it was. The dam was completed about 1917 and all was fine, except that from the time the dam was built there was no water in the river to run the turbines!

"A hell of an engineer you are" said one of the saddened bankers.

"My little black book just tells me how to build dams," said Mr. Streiff. "It doesn't say anything about how to forecast river run off for the years to come."

"Why doesn't it?" said the banker.

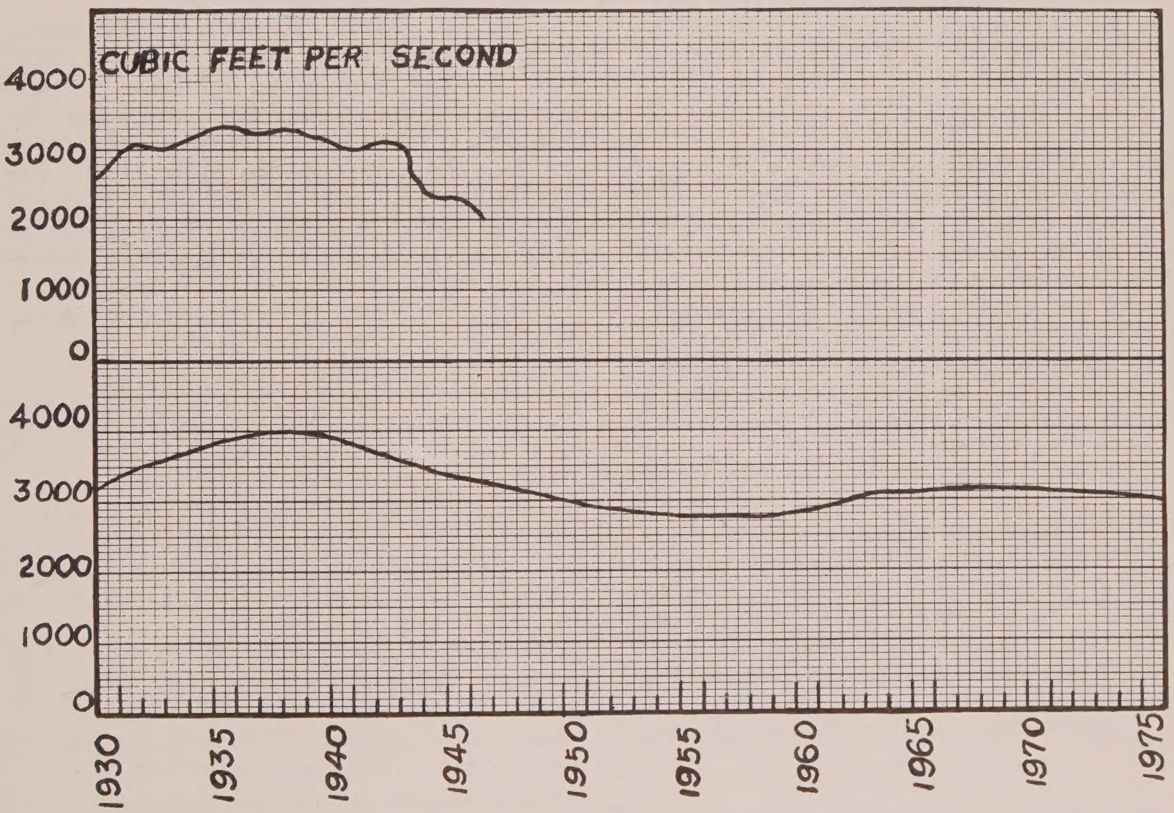
This set Mr. Streiff to thinking. He concluded, properly, that the only possible answer lay in a knowledge of cycles. First he tried regular cycles, but he soon found this approach inadequate and too complicated. Then he developed techniques for isolating and projecting *irregular* cycles. These techniques are applicable to figures of any sort. Mr. Streiff explained these methods to me and also gave me their mathematical justification.

As Mr. Streiff put it, he is getting on in years and wants to leave behind, where it can be used to help humanity, the results of his 37 years of work in this field.

I have already started to experiment with Mr. Streiff's techniques. You will hear more about them in future reports. In the meantime you might like to see an example of how they work. The chart below shows a forecast of the flow of the Colorado River at Austin, Texas, made in 1929 and how it turned out in the years which followed.

### *New Cycle Discoveries*

On Monday, the last of the four days in New York I have been telling you about, I had lunch with Dr. J. Douglas Webster of London. Dr. Webster, you may remember, is the author of a little



FLOW OF THE COLORADO RIVER AT AUSTIN, TEXAS

Upper Curve: Actual flow, smoothed. (The smoothing process loses values 1947—1953.)
Lower Curve: Projection made in 1929 by Mr. A. Streiff.

paper which shows that many poets, musicians, and writers have begun new creative work at intervals based on a cycle 33 weeks (7.6 months) long. (We reprinted this paper for you as Foundation Reprint No. 9.)

In addition to discovering that inspiration is at least sometimes cyclic, Dr. Webster has discovered that outbreaks of influenza tend to come at similar intervals. He has likewise discovered that the recurrence of cancer and certain other diseases behaves likewise.

From diseases of the body to diseases of the mind is an easy step. Dr. Webster is now writing a book in which he has measured the time intervals between attacks of mental disease in nearly a thousand patients. He finds that in over 90% of the cases the same basic time intervals governs. Attacks usually come at 33 weeks (± 3 weeks) or at half or multiples of this period.

### *The Cause of Cycles*

The rest of Monday was spent with a man from Washington whose position in the government is such that he must be known merely as "Mr. Charles."

Mr. Charles turned over to me the results of ten years of spare time research. These results seem to bring us one step nearer to an understanding of the nature and cause of at least some of the cycles with which we come in contact.

Mr. Charles has some hypotheses. His research has been directed to proving or disproving their validity. So far the research suggests that the hypotheses are correct. If so, the implications are staggering. Much more work needs to be done. Mr. Charles, like Mr. Streiff, wants his work put to use for the benefit of humanity. He has turned it over to the Foundation in the hope that we can carry out the research needed to prove the matter one way or the other, for good and all. Perhaps we can, if Mr. Anonymous raises us that $100,000! Mr. Charles does not argue that his hypotheses are true. But the evidence he presents convinces me that his approach *must* be investigated.

Oh yes! Thinking of Mr. Charles and his discoveries--about which I shall tell you as soon as I can—reminds me of a letter from one of our members.

This man writes, in strict confidence, of a 59 day cycle in the *physical properties* of the raw material used in his factory. He has found the same behavior in another factory of the same sort. I am not free to give you the name of the raw material or the kind of industry involved. The time interval involved is seemingly in accordance with one of Mr. Charles' hypotheses.

Faithfully yours,

Edward R. Dewey

# CYCLES IN AUTOMOBILE SALES--CONTINUED

## THE 23 2/3-MONTH CYCLE

*SUMMARY*

*Now that we have pinned down the 23 2/3-month cycle in the factory sales of passenger cars it is possible to make a preliminary projection. This projection suggests that, relative to trend, the 12-month total centering on next spring should show improvement over the 12-month total centering on last summer. However, the 12-month total centering on next December should be, relatively, not so good.*

*Until I have pinned down the larger cycles, (6 years, 13 years, etc.) I hesitate to hazard a guess as to the actual number of cars. I shall, however, get into the matter of the longer cycles at the earliest opportunity.*

*The 23 2/3-month cycle has a strength of 114.5% of trend at time of crest, 87.3% of trend at time of trough. The current crest is due ideally at March 1955. The next trough is due ideally 12 months later.*

TO the cycle student the interesting thing about the 23 2/3-month cycle in the factory sales of passenger automobiles is that it is seemingly an exact third of the well known 5.91-year cycle. This cycle, as best we can measure it, is an exact third of the well known 17 3/4-year cycle. This threefold progression could not easily be the result of accident. It suggests that at least some of our cycles may be related to each other--that they are part of some larger system of which we are just beginning to have a glimpse.

If I had the time I would like to see if the so called 8-month cycle, on its part, is really an exact third of 23 2/3 months. I would also like to see if there is another cycle an exact third of that one. But who, except the scientist at heart, is interested in *law*? Everybody else wants *results*.

### *Results Overleaf*

You will find results overleaf. Fig. 1 shows factory sales of automobiles, 1913 to date, smoothed by a 12-month moving average. (That is, each point on the sales curve in Fig. 1 represents the average number of cars sold during the year centering on that month.)

The broken line running across the page in Fig. 1 represents the combination of perfectly regular cycles, 41, 36, & 23 2/3 months long. As you can see by placing a ruler or even a piece of paper vertically on the page, this synthesis of cycles conforms more or less to the minor fluctuations of the actual sales behavior.

### *More Charts*

You can see this better by looking at the bottom curves (E′ & F) page 350 and 351 where the short term fluctuations are shown all by themselves. The solid line (F) shows the short term fluctuations expressed as percentages of their moving

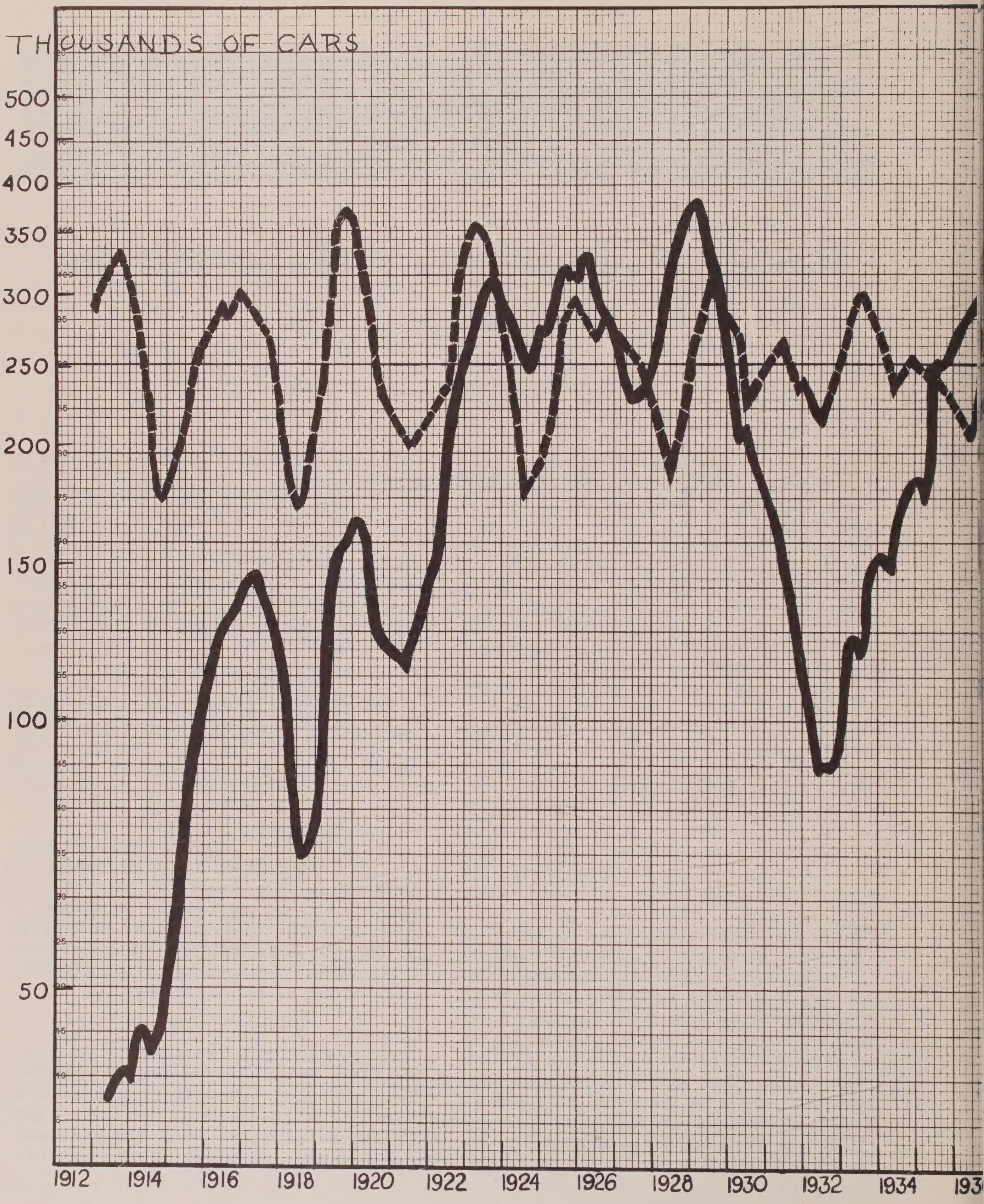
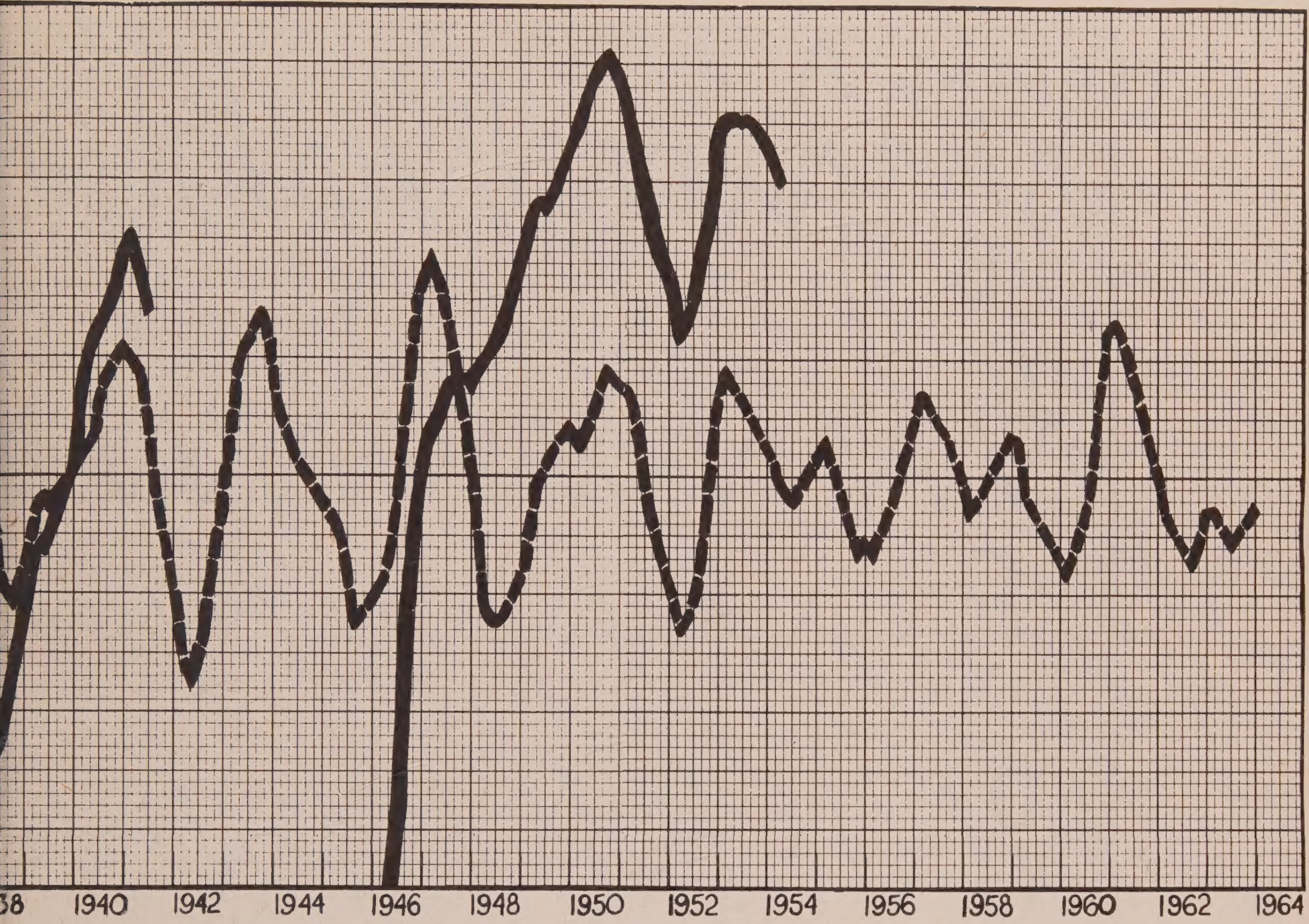


Fig. 1. Factory Sales of Passenger Automobiles by month, Jan. 1913—Sept. 1954, smoothed by a 12-month moving average. (Each point on the curve represents the average number of cars sold in the year centering at that point.)

Broken line, synthesis of the 41-, 36-, and 23 2/3-year cycles.



average trend. The broken line (E′) shows a synthesis of the three cycles named above.

Working our way up the page, Curve E shows the synthesis all by itself. Curves D, C, & B′, show the 41-, 36-, and 23 2/3-month cycles respectively. (The 41-month cycle was discussed in our report for October 1954, the 36-month cycle in our report for November 1954.)

The top Curves, A & B, show how the 23 2/3-month cycle was derived. B, the broken line, is of course merely the ideal 23 2/3-month cycle. Curve A represents the short term fluctuations after adjustment for the 41- and the 36-month cycles. It is the curve from which Curve B was derived.

The 23 2/3-month cycle has the following ideal characteristics: Strength at time of crest 114.5% of trend, strength at time of trough 87.3% of trend. Ideal time of current crest *March 1955*, ideal time of next trough *March 1956*.

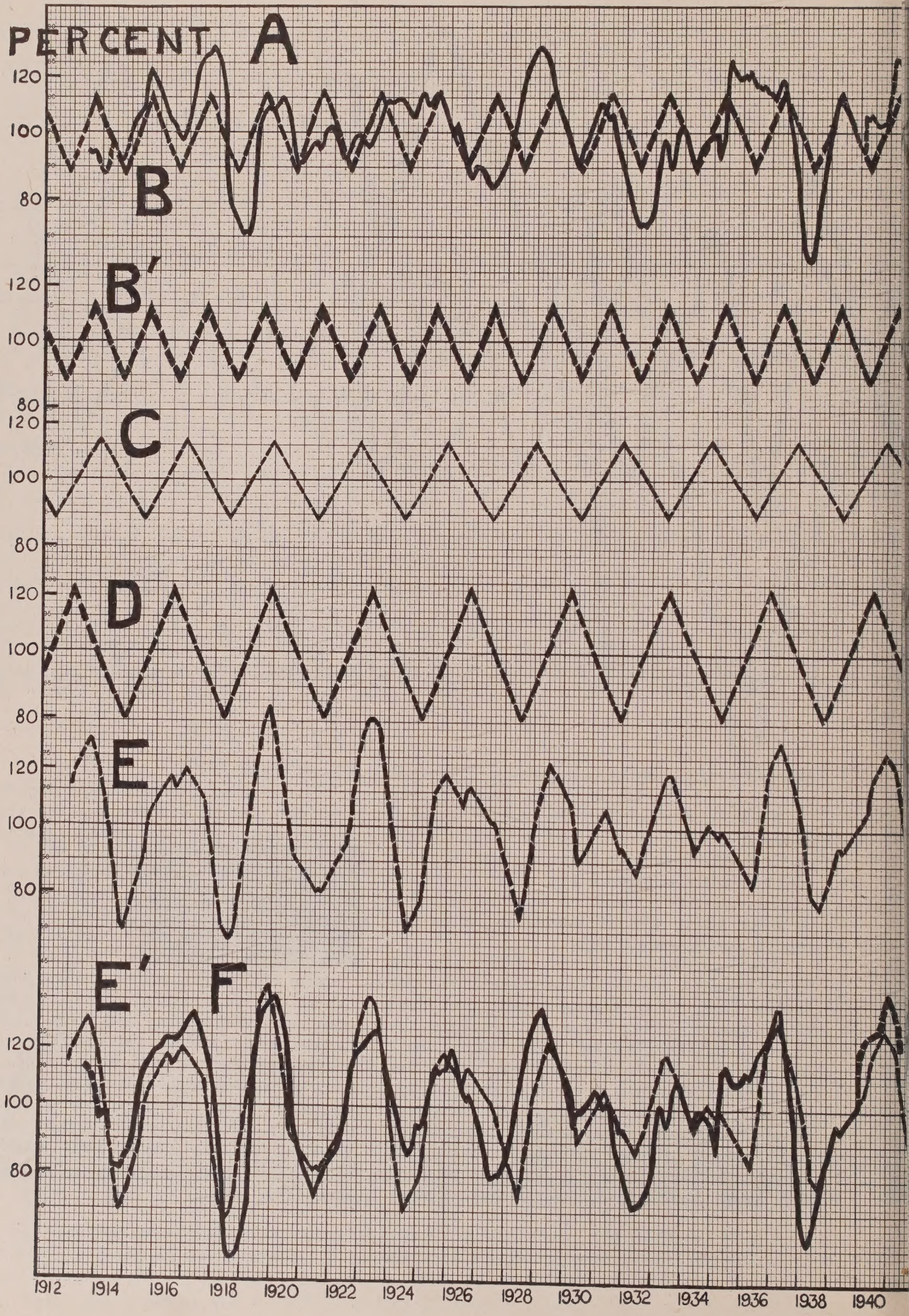
The synthesis of the three cycles shows the following percentages of the 41-moving average trend for the months indicated.

[redacted]

1954 95% of trend.
1955 108% of trend.
1955 85% of trend.
1956 88% of trend.
1956 85% of trend.
1957 118% of trend.

Note that these values assume that these cycles are significant and that they will continue. Note also that they are percentages of *trend*. Before they can be translated into actual numbers of cars we must estimate what the trend is going to be. That will be the next step in the study. It will take a little work. However, in view of the tremendous importance of the automobile industry, it will be worth it.

*E.R.D.*


PERCENT
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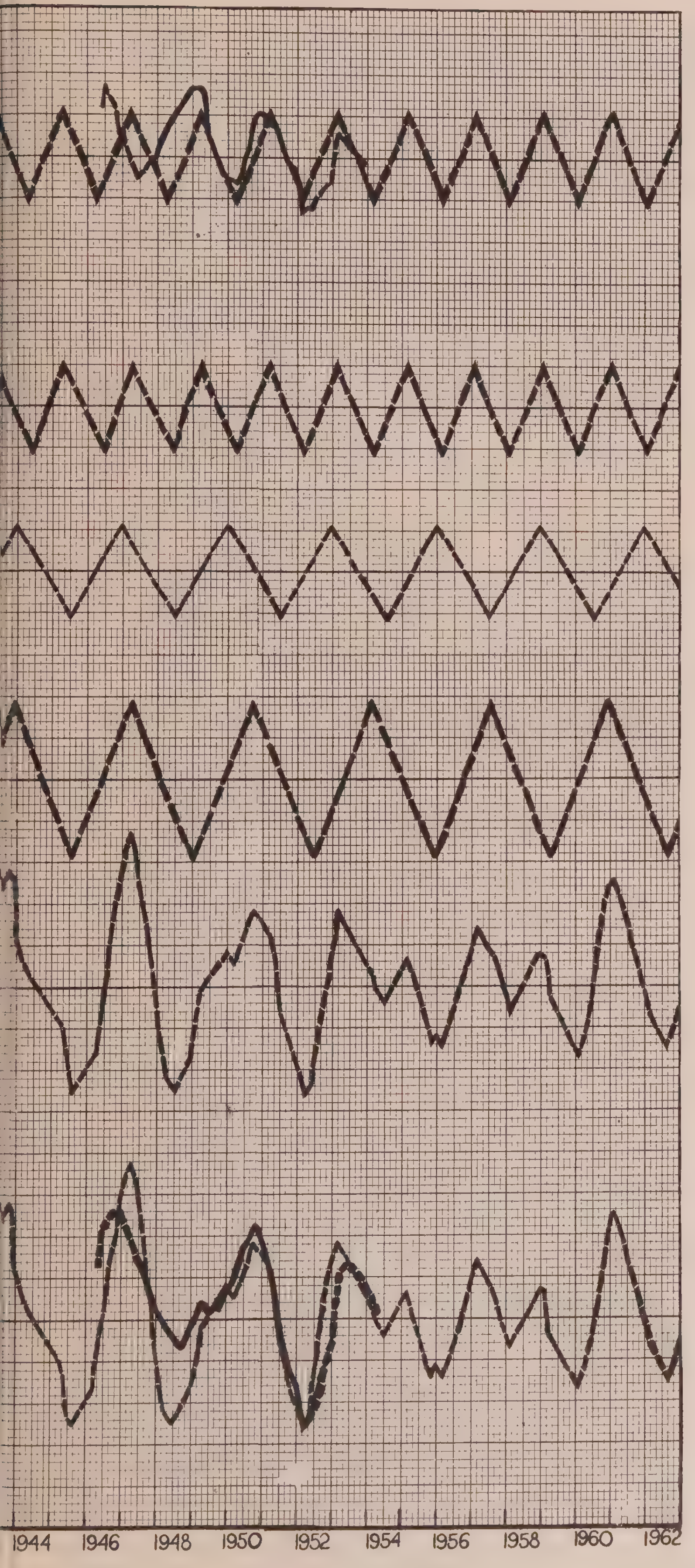


Fig. 2. Short Term Cycles In The Factory Sales of Passenger Automobiles.

Curve A. Short term fluctuations after adjustment for the effect of 41- and 36-month cycles. A 23 2/3-month cycle is clearly visible.
Curve B. (Broken Line) a perfectly regular 23 2/3-month cycle.
Curve B′. Same as Curve B, but set out by itself so that it can be seen more easily.
Curve C. The 36-month cycle (see Report for Nov. 1954).
Curve D. The 41-month cycle (see Report for Oct. 1954).
Curve E. A combination of the 41-, 36-, and 23 2/3-month cycles. (Curves B, C, and D above).
Curve E′. Same as Curve E.
Curve F. The short term fluctuations before adjustment for anything. Note that they are pretty well described by the combination of the three cycles but that there are distortions. Distortions must be expected in the future too, no matter how well the cycles work out. (For the technician: Curve F represents deviations from a 41-month moving average (extrepolated), smoothed by a centered 12-month moving average.)

# THE 9.3- AND 8.6-YEAR CYCLES IN COPPER PRICES, 1784-1953

AN exploration of copper prices (1784-1953) for cycles from 8½ to 9½ years in length discloses two important cycles within this range. They measure 8.60 and 9.28 years long respectively.

The combined effect of these two cycles has been upward since the second quarter of 1950; it is due to reach its maximum at the 1st quarter of 1956. It is then due to level until the 2nd quarter of 1959, after which it is due to decline until the 4th quarter of 1960.

The above statement is not to be construed as a forecast of copper prices. It is merely a statement of the combined effect of two out of what are probably many cycles in these figures.

It is noteworthy that the lengths of these two cycles in copper prices are not quite the same as the lengths in pig iron prices. You may remember that in pig iron prices the lengths were 8.53 and 9.20 respectively. I suppose this tells us that with only 20 repetitions of the cycle we cannot hope to measure our length correctly within an error of about 1%.

When we find cycles of seemingly the same length in economic data of different sorts it is not too surprising. Many of the different parts of the economy go up and down more or less together. But if we can find cycles of the same length in the economy *and in natural science figures* we have a right to suspect that we may be dealing with something pretty fundamental.

That is why I was so pleased to be able to report to you recently about the 9.2- or 9.3-year cycle in grasshopper abundance (June-July 1953 and November 1954 reports).

Also, the exhaustive periodic table analysis of sunspot numbers recently made by G. T. Lane shows a cycle of 9.3-years long clearly present in sunspot abundance. Lane's work thus carries evidence of this cycle beyond the earth.

Lane also found cycles in sunspot numbers with lengths of 8.36 and 8.76 years. Cycles of these two lengths could combine into a cycle 8.56-years long over a period of about 175 years.

The charts to show the copper price studies require 8 pages. I do not feel that your interest in the subject justifies the use of so many pages. Therefore, I am not publishing them here. (If you *are* interested you can see them in the Fall 1954 *Journal of Cycle Research,* price $1.00.) I do think, however, that for the sake of the record I should set down the detailed characteristics of these two cycles. They are as follows:

### *The 9.3 year Cycle*

The longer of the two cycles, as nearly as we have been able to measure the length, is 9.28 years from crest to crest or from trough to trough. The ideal time for the latest trough was May 1951. The next crest for this cycle is due ideally January 1, 1956. The typical amplitude of the 9.28 year cycle in the actual price is 114.3% of trend at time of crest. It is 87.5% of trend at time of trough. The shape, as nearly as we have been able to determine it, is zig zag when plotted on ratio scale.

### *The 8.6 year Cycle*

The length of this cycle as nearly as we can measure it is 8.60 years from crest to crest or trough to trough. The ideal time for the current trough is February 1955.

Typical amplitude of the 8.6 year cycle in copper prices is 111.9% of trend at time of crest; 89.3% of trend at time of trough. The shape, like that of the 9.28-year cycle seems to be zig-zag when the cycle is plotted on ratio scale.

Of course the behavior which is accounted for by two cycles of 9.3 & 8.6 years respectively could be a single cycle of varying length and/or amplitude.

Remember that this study is merely the first step in an investigation of copper prices. When some more cycles in copper prices have been uncovered it will be in order to hazard a guess in regard to the course of the price of this commodity.

*E.R.D.*

# How it Came Out

# THE 6-YEAR CYCLE

## —IN SWIFT AND COMPANY
## —IN MONSANTO CHEMICAL
## —IN NATIONAL LEAD
## —IN STANDARD OIL OF CALIFORNIA

A SIX-YEAR cycle dominates many aspects of American business activity. A full account of our research in respect to this cycle was contained in my report for December 1950, which see. In that report I showed you the extent to which this cycle had been present in the sales, shipments, or production of 25 leading corporations as well as in various natural phenomena. The purpose of this article is to examine the figures of four of the companies discussed in the December 1950 report to see how the 6-year cycle in their figures has unfolded.

### *Some Explanations and Definitions*

When we talk about a "6-year cycle" in a series of figures we mean that the figures act as if they had been subjected to a force that was alternately positive or upward for about three years and then negative or downward for about three years. Such an alternation of upward and downward forces would, ideally, produce a succession of complete waves or cycles, each about six years long. Such a cycle is said to be **rhythmic** because it repeats with some degree of regularity--that is, with a beat. **Rhythm** comes from a Greek word meaning **measured time**.

The successive waves of a 6-year cycle will not all be six years long. Some will be longer, some will be shorter. The 6-year cycle must be thought of as a **tendency**. Actual behavior is buffeted about by other cycles and by random forces.

### *Cycles Are Relative*

Also, the upward and downward legs of a 6-year cycle must be thought of as modifications of the underlying growth trend, not necessarily as absolute upward and downward movements. The business may be growing so fast that the downward force of the 6-year cycle may merely slow down or check the rate of advance. Therefore, in many instances the 6-year cycle may not cause any decline at all in the actual figures. It is for this reason that the 6-year cycle, or any other cycle, can be seen more easily if we correct for trend.

### *Trend*

Trend is the tendency of data in a series of figures to increase or decrease during a long period of time. How long is "long" will be discussed elsewhere.

There are various ways of measuring trend. For cycle study a trend computed by means of a moving average is often best. For studying a 6-year cycle you should use a 6-year moving average trend. This is the trend that has been used in this study.

For each company the upper chart shows,

by means of a solid line, the actual figures for sales, production, or whatever. The six-year moving average trend is shown by means of a broken line. The figures adjusted for trend are shown for each company in the lower chart.

*Figures for Five More Years Now Available*

In the earlier work, figures for 1948 were the latest available. We now have figures for 1949, 1950, 1951, 1952, & 1953. These additional values are shown on upper charts following, by means of a heavy solid line. The line is heavy to show that these figures have come into being since the earlier report was written.

As a 6-year moving average trend cannot be computed for the first three or for the last three years of a series of figures, the trend in the earlier work stopped in 1945. All the lower curves, which show values adjusted for trend, stopped in that year also, necessarily.

With figures now available for five additional years, we can compute the moving average values through 1950. This has been done. This computation enables us to calculate values for figures adjusted for trend (lower) for these five years also. These values, like the values of the original data, have been plotted by means of a bold line so that you can see how the curves have unfolded through 1950.

*Seeing the Cycle Up-to-date*

In order to see how the cycle has unfolded for the last three years, you will have to project the trend line mentally for the years 1951, 1952, and 1953 and see the extent to which the actual values are above or below this imaginary trend.

I could do this for you, but I would rather not because, by raising or lowering the trend line, I could make a 6-year cycle appear or disappear at will. Anyway your guess of trend is likely to be as good or better than mine.

The purpose here is to see the extent to which the 6-year cycle has come true since discovery in order to get some additional light in regard to its probable significance (not to forecast). These projections are not to be thought of as forecasts except in a very general way. The 6-year cycle is only one of many cycles which seem to have been present in the sales of these different companies. To try to forecast the sales of these companies from a knowledge of this one cycle alone is similar to trying to run an automobile on one cylinder. You can run an automobile on one cylinder but the process will not pull a car. All it will do is show you if that one cylinder is working. It is the same with the 6-year cycle.

## The 6-Year Cycle in Swift and Company

THE record of the 6-year cycle in the sales of Swift and Company is impressive. Officials of the company have been kind enough to dig up sales records for me back to 1892. Sales 1892—1953 are charted in Fig. 1 on page 355. Fig. 1 also charts the 6-year moving average trend, 1895—1950 and estimate of trend for 1892-94. A tendency for ups and downs to recur at intervals of about 6 years is clearly evident by inspection.

The six-year cycle can be seen even more clearly if we express the data as percentages of trend as in Fig. 2 on the same page. It is unusually dominate and regular. Of the 10 troughs in these percentages 6 have come within half a year of perfect timing, 2 have come within 1½ years of perfect timing, and 2 were badly distorted. Of the 10 highs, 5 have come within half a year, 5 within a year and a half, of perfection. Ideally the 6-year cycle runs from 12½% above trend at time of crest to 12½% below trend at time of trough. The average wave and a diagram of the ideal cycle is shown below. Ideally the current crest of the 6-year cycle in Swift and Company is due right now. That is, at the end of 1954. From now until the end of 1957, sales, ideally, are due to go down, relative to course to trend. As the crest comes ideally at the end of 1954 the six-

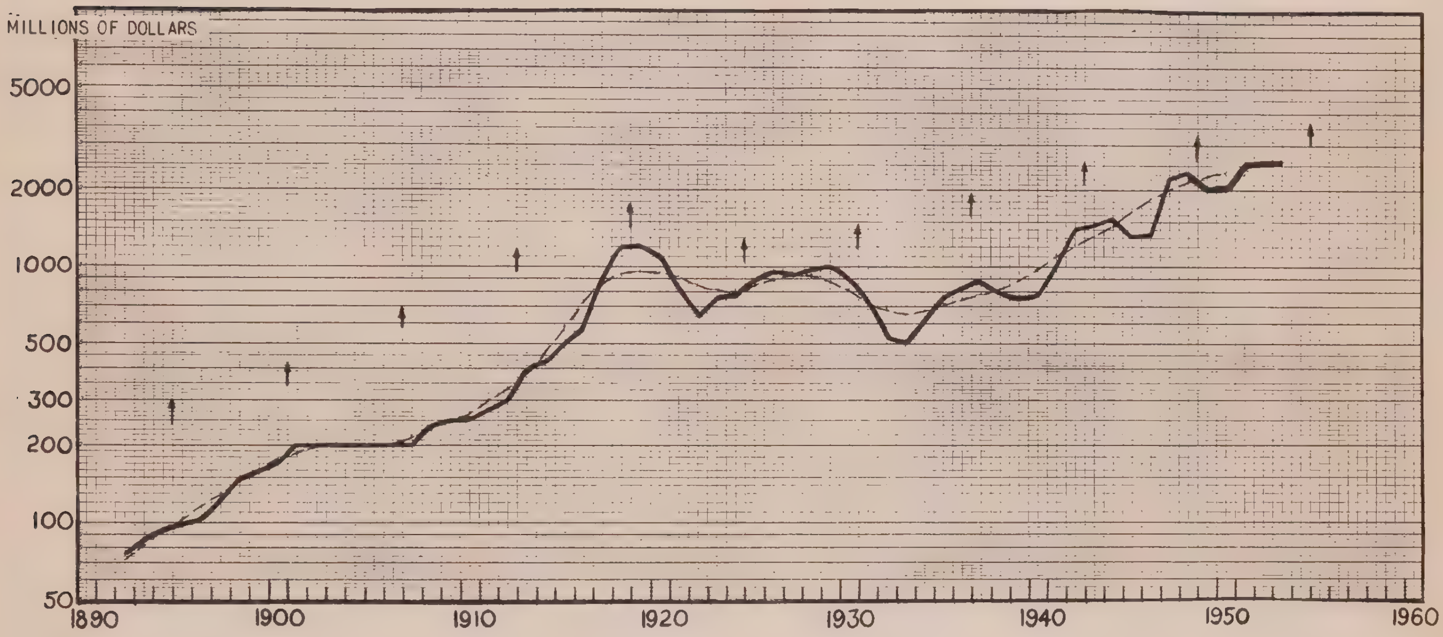


Fig. 1. Swift and Company, Total Dollar Sales, 1892—1953, together with a six-year moving average trend (first three values estimated). Arrows indicate time of ideal high of six-year cycle. Ratio Scale.

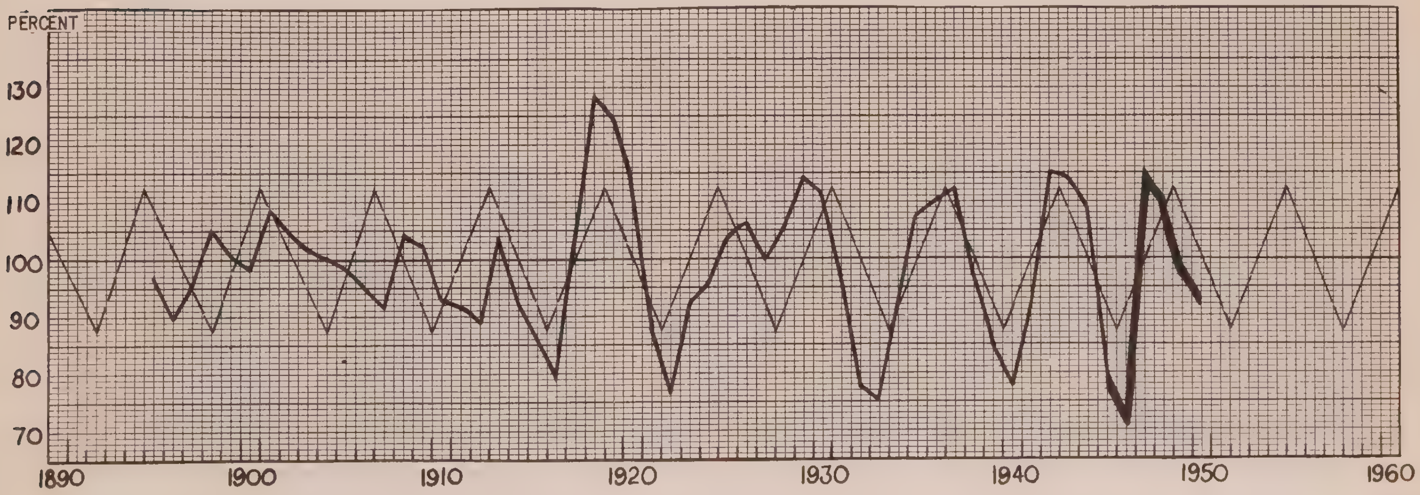
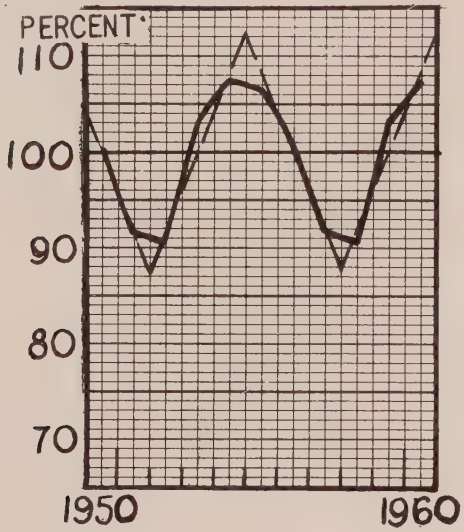


Fig. 2. The Six-Year Cycle in Swift and Company, Total Dollar Sales, Deviations of the actual sales from their six-year moving average. Bold line shows behavior since the projection was first made. Zigzag line shows ideal 6-year cycle.

year cycle could be expected to cause the *annual* figures to have a flat top with sales for 1954 and 1955 about equal. Of course in actual practice, because of other cycles and random variations this is not likely to happen. *However, again ideally, the odds favor the major drop to come from 1955 to 1957.*



If the current cycle is normal, the sales for 1953 should have been on trend. If they were, the underlying growth trend of Swift (in dollars) is slackening. This is just about the time this sort of thing should happen if the two big waves cresting about 1900 and in the mid 1920's are repetitive cycles and not mere oscillations. Of course with only two repetitions no one can really know.

In 1952, with sales figures for 1951 in front of me, I said, "The next crest of the ideal 6-year cycle in Swift and Company [sales] is due halfway between 1954 and 1955. Things look good for dollar sales in Swift and Company for the near future if the 6-year cycle in these figures continues." Sales did advance steadily, as you can see from the chart, but they did not advance as much as I would have guessed if at the time (after 1951 sales were known) I had been pressed for a figure.

## The 6-Year Cycle in Monsanto Chemical

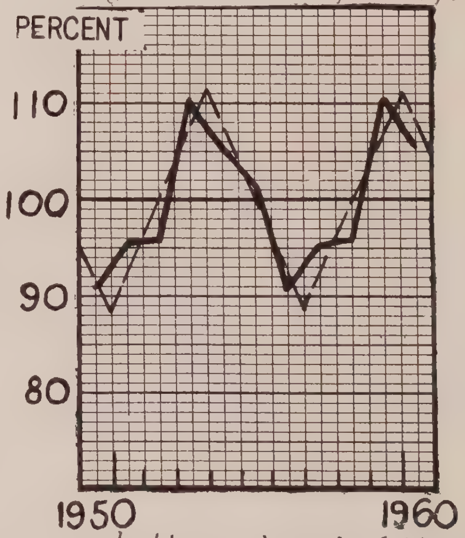
DOLLAR sales of Monsanto Chemical Company from 1927 to 1949 show three clearcut 6-year cycles with areas of strength about 1929, 1935, 1941, and 1947. Areas of weakness fall about half way between.

There is also strength in 1953, as called for by a projection of the 6-year pattern I made in 1950. However, there was a bad distortion in 1950 and 1951. Those years were years of strength, whereas the projection of the 6-year pattern called for years of weakness at that time.

Twenty-seven years of experience is not very much to go on, but it is all we have.

All facts are shown in Figs. 3 and 4 on page 357. Fig. 3 shows actual sales 1927-1953 and trend 1930-1950. It also shows an estimate of trend 1927-1929. I have not ventured to estimate trend for 1951-53, but it is still very strong.

Fig. 4 shows percentages by which actual sales were above or below trend. The curve in Fig. 4 ends in 1950 because trend figures end in that year. Fig. 4 shows a diagram of the 6-year cycle.



Crests come *ideally* at the end of 1953 and at 6-year intervals forward and backward from that date. This is a slightly revised

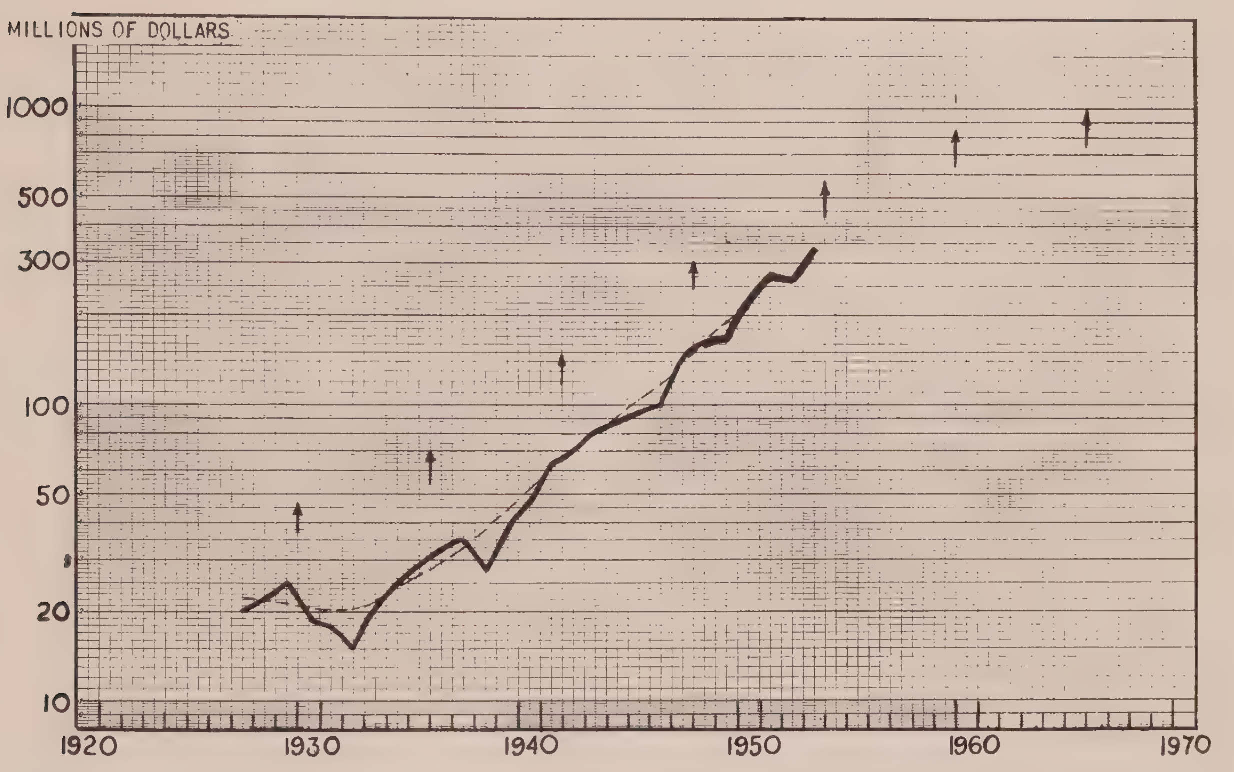


Fig. 3. Monsanto Chemical Company, Total Dollar Sales, 1927--1953, together with a six-year moving average trend (first three values estimated). Arrows indicate time of ideal high of six-year cycle. Ratio Scale.

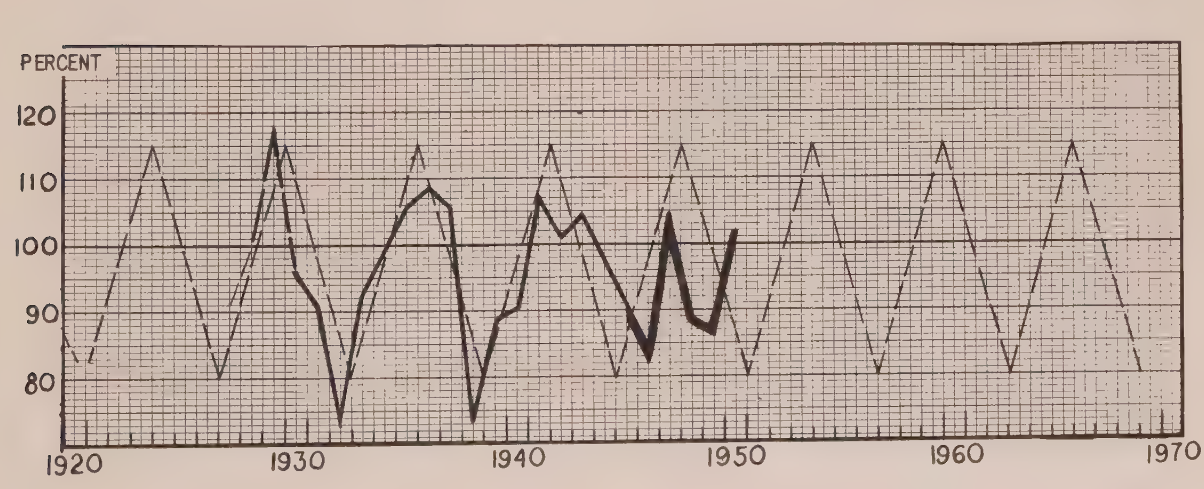


Fig. 4. The Six Year Cycle in Monsanto Chemical Company, Total Dollar Sales. Deviations of the actual sales from their six-year moving average. Bold line shows behavior since the projection was first made. Zigzag line shows ideal 6-year cycle.

timing for the 6-year cycle based on latest available data. (In 1950, when this cycle was first discovered, the timing was set half a year earlier.)

The 6-year cycle in Monsanto has been fairly regular. In the deviations from trend, crests have always come within half a year of perfect timing. Of the four troughs, two were within half a year of perfect timing, two were distorted by a year and a half.

A diagram of this cycle as it has appeared on the average throughout the course of available figures is shown above herewith. The thin broken line idealizes the behavior. The cycle, if it continues, will exert a downward force until the end of 1956.

Ideally the six-year cycle in Monsanto sales runs from about 11½% above trend at crest to about 11½% below trend at trough. This is an overall move of 22½% of trend in 3 years or about 7% of trend a year. These are the *ideal* expectations from the end of 1953 to the end of 1956 *relative to trend*. However, this fact does not suggest an actual decline in sales. Trend is still strongly upward. In 1950, the latest year for which figures are available, the 6-year moving average trend advanced 15.8% compared with 1949. *The effect of the downward phase of the cycle should therefore merely be to check the rate of advance until about 1956 or 1957.*

## The 6-Year Cycle in National Lead

SALES of National Lead Company are available only from 1930. They show a reasonably good 6-year cycle over this period of time, but with a bad distortion in 1950 and 1951. In this they are like the sales of a number of other companies.

Twenty-four years of figures for a cycle 6 years long gives us only four repetitions of the cycles. This is too little to go on. Were it not for the fact that other longer series of figures show a 6-year cycle coming at about the same time you would consider this cycle in National Lead mere happenstance. However, in view of the prevalence of a cycle of this length in other aspects of our economy (and in natural science phenomena as well), the 6-year cycle in National Lead would seem to be useful to know about.

For example, in our report for January 1953 I told you "The sales of the company for 1953 and 1954 should, if the 6-year cycle in these figures continues to dominate, show an increase relative to trend, but of the two years, strength for 1954 is of course less certain." Sales for 1952 were $358,048,000. Sales for 1953 were $436,051,000. Sales for 1954 are not available as I write, but the sales for the 1st 6 months were down 4½% compared with corresponding sales in 1953.

Actual sales of National Lead, 1930-1953 are charted in Fig. 5 on page 359. Fig. 5 also shows trend 1933-1950 and an estimate of trend 1930-32. I did not venture to forecast trend for 1951-53, but it seems to be still strongly upward.

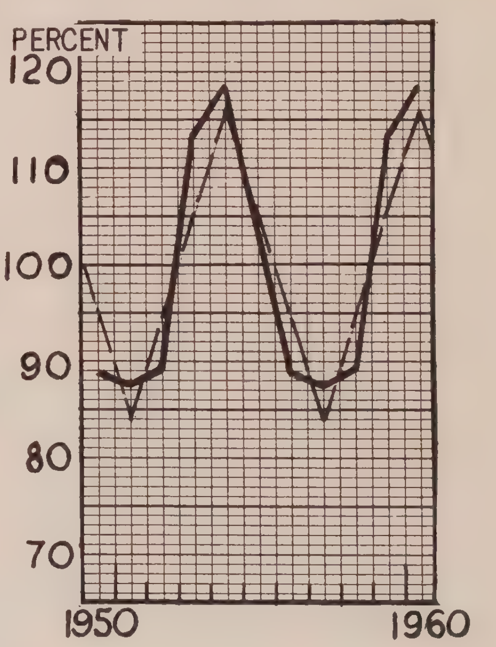


Fig. 6 on the same page shows a chart of the percentages by which actual values are above or below trend. The chart ends in 1950 because trend values are not available past that time. Fig. 6 also shows a

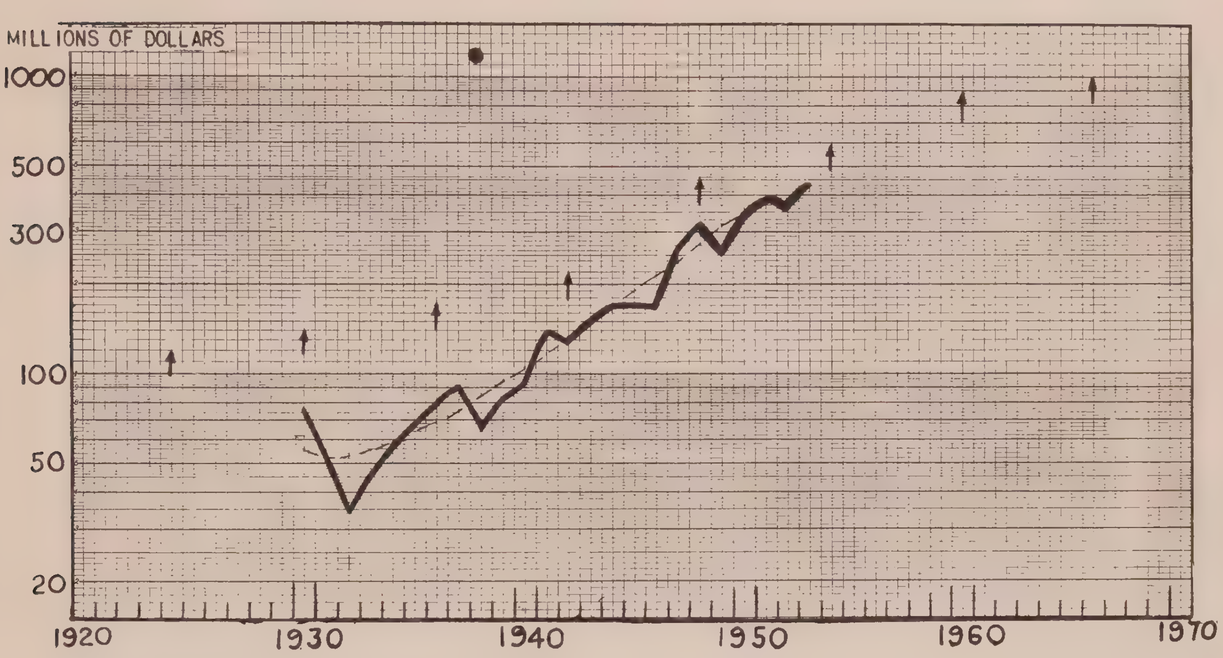


Fig. 5. National Lead Company, Net Sales, 1930—1953, together with a six-year moving trend (first three values estimated). Arrows indicate time of ideal high of six-year cycle. Ratio Scale.

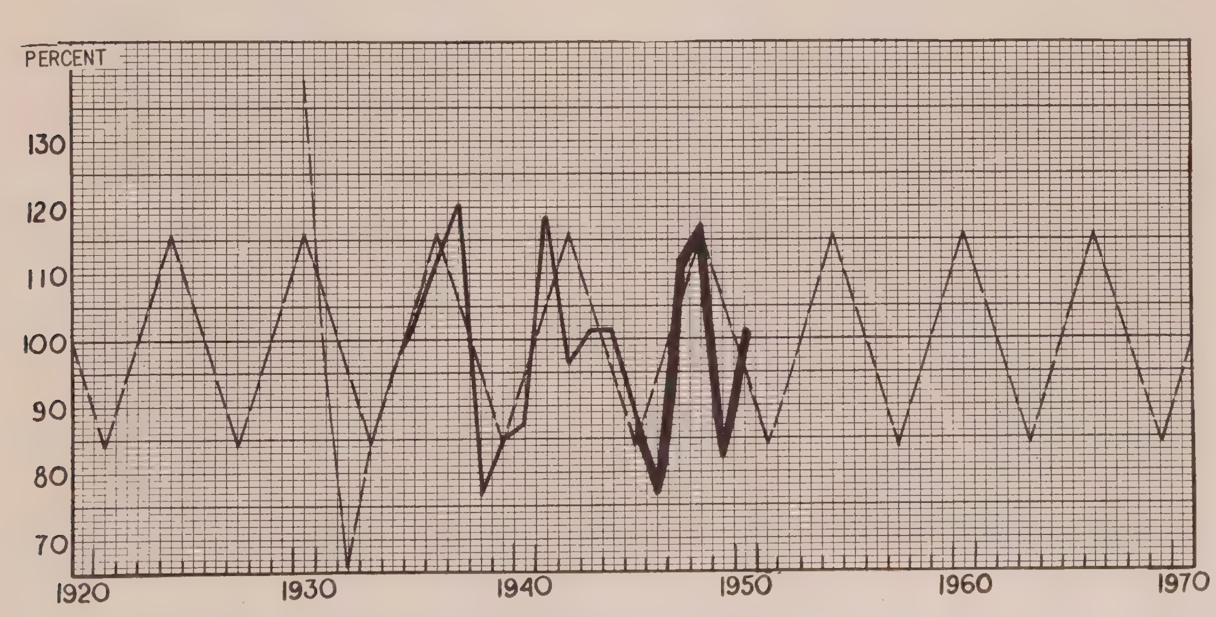


Fig. 6. The Six-Year Cycle in National Lead Company, Net Sales, Deviations of the actual sales from their six-year moving average. Bold line shows how the forecast has worked out. Zigzag line shows ideal 6-year cycle.

diagram of the idealized 6-year cycle.

The 6-year cycle in National Lead has been quite regular. In the deviation from trend all crests have come on time or within a year of perfect timing; all troughs, except the last one, came likewise. The last trough was pushed ahead two years by the bulge of 1950-51.

An average of the usable figures shows that the 6-year cycle in these figures crests ideally in 1954, troughs ideally in 1957. The cycle has a variation of about 16% above trend at time of crest to about 16% below trend at time of trough. It is charted above herewith. This fact suggests a decline of about 32% of trend in the downward phase of the cycle. This amounts to about 10% of trend a year, *relative to trend.* Trend however is still strongly upward (about 10% a year).

*The net effect of the downward phase of the 6-year cycle is, therefore, likely to be merely a leveling off until about 1956 or 1957.*

## The 6-Year Cycle in Standard Oil of California

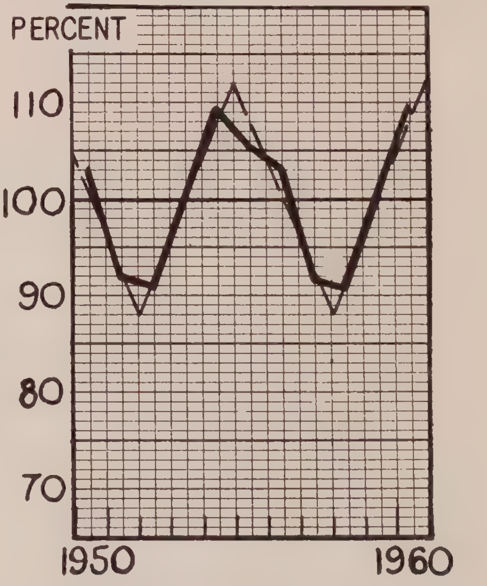
FIGURES of Gross Operating Income of Standard Oil of California are available only from 1926, but the regularity of the 6-year cycle in large measure makes up for the shortness of the series. As you can see by reference to Fig. 7 on page 361, the 6-year cycle in these figures dominates to an unusual degree. Fig. 7 also charts the 6-year moving average trend of these figures, 1929--1950, and estimates of trend 1926-28.

For a better picture of the cycle look at Fig. 8 on the same page. Fig. 8 charts the percentages by which actual income was above or below trend. You will see that all four crests have come within half a year of ideal timing. All but one of the troughs likewise. The erring trough, in 1932, came a year and a half away from perfection. I suspect that when we are able to compute trend for the past three years we will find that the low of this present cycle was similarly distorted. That is, by looking at Fig. 7 and guessing trend, it looks as if the low came in 1950 instead of halfway between 1951 & 1952 as called for by the ideal 6-year pattern.

The current crest is due right now, i.e. midway between 1954 & 1955, after which three years of decline, relative to trend, are, ideally, in order.

The 6-year cycle in Standard Oil of California like all the other 6-year cycles herein discussed, was discovered in 1949 with figures available only through 1948. With five additional years of figures we find the cycle confirmed but it now appears that the timing of the cycle is half a year different for both highs and lows than was determined at that time.

As you can see from the accompanying chart the average cycle has a strength of about 12% above trend at time of crest; 12% below trend at time of trough. However, as crests and troughs fall *between* the year the *annual* figures will show, ideally, only 8% above and below trend for the years on each side of the turning points.



Trend is still strongly upward. I would guess at the rate of about 8% a year. *This increase in trend should just about nulify the decline from 1955 to 1957 due, otherwise, as a result of the 6-year cycle.*

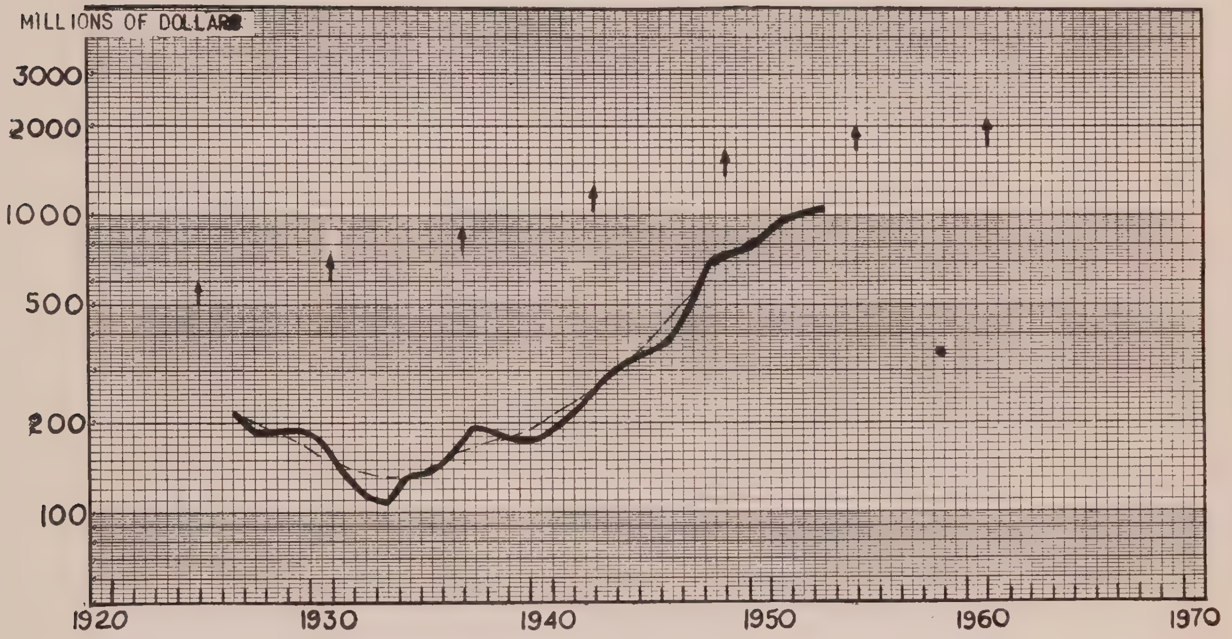


Fig. 7. Standard Oil Company of California, Gross Operating Income, 1926—1953 together with a six-year moving average trend (first three values estimated). Arrows indicate time of ideal high of six-year cycle. Ratio Scale.

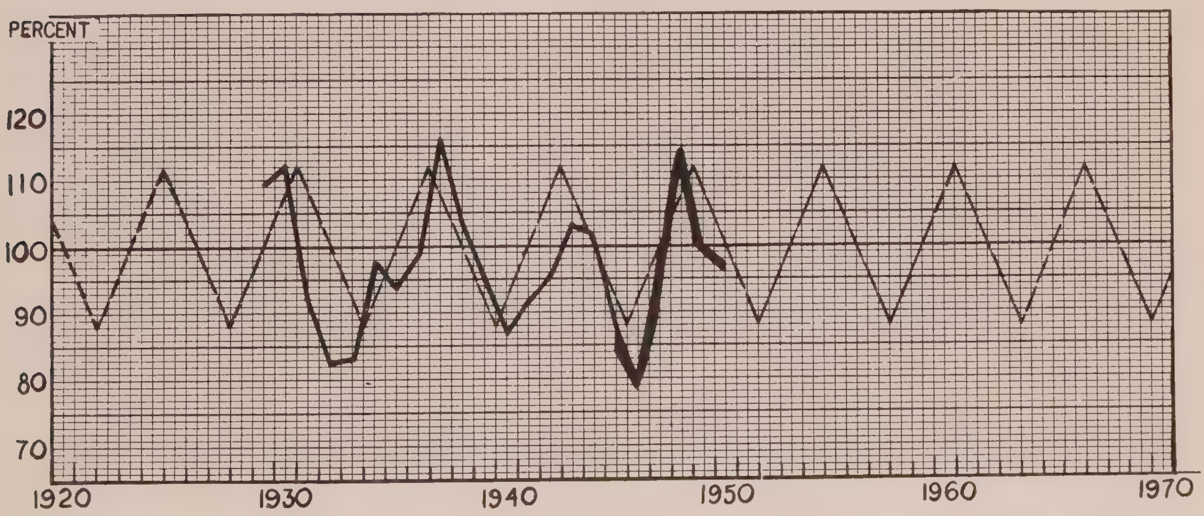


Fig. 8. The Six-Year Cycle in Standard Oil Company of California, Gross Operating Income. Deviations of the actual sales from their six-year moving average. Bold line shows behavior since the projection was first made. Zigzag line shows ideal 6-year cycle.

# THE MODIFIED GEISINGER INDICATOR

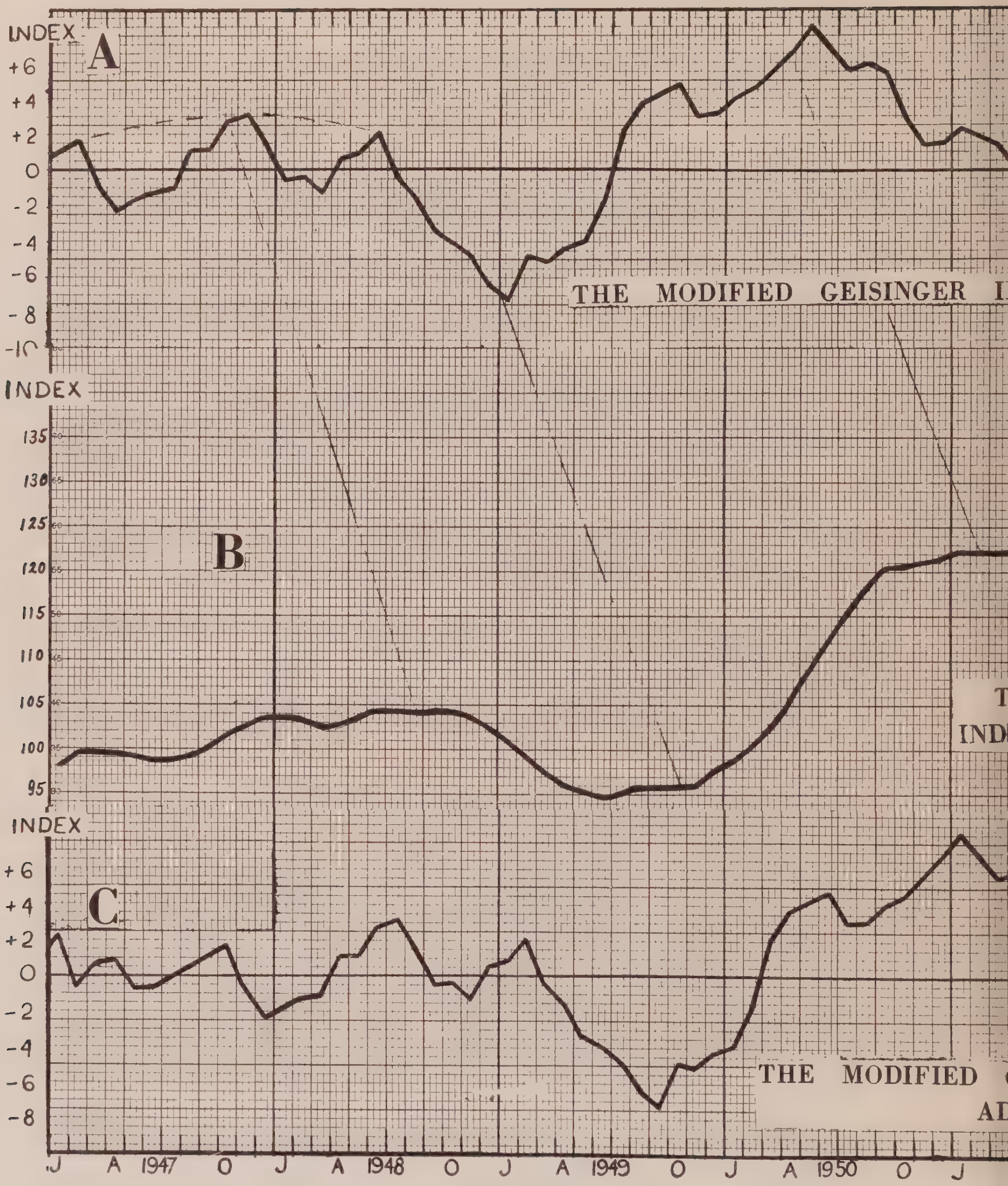
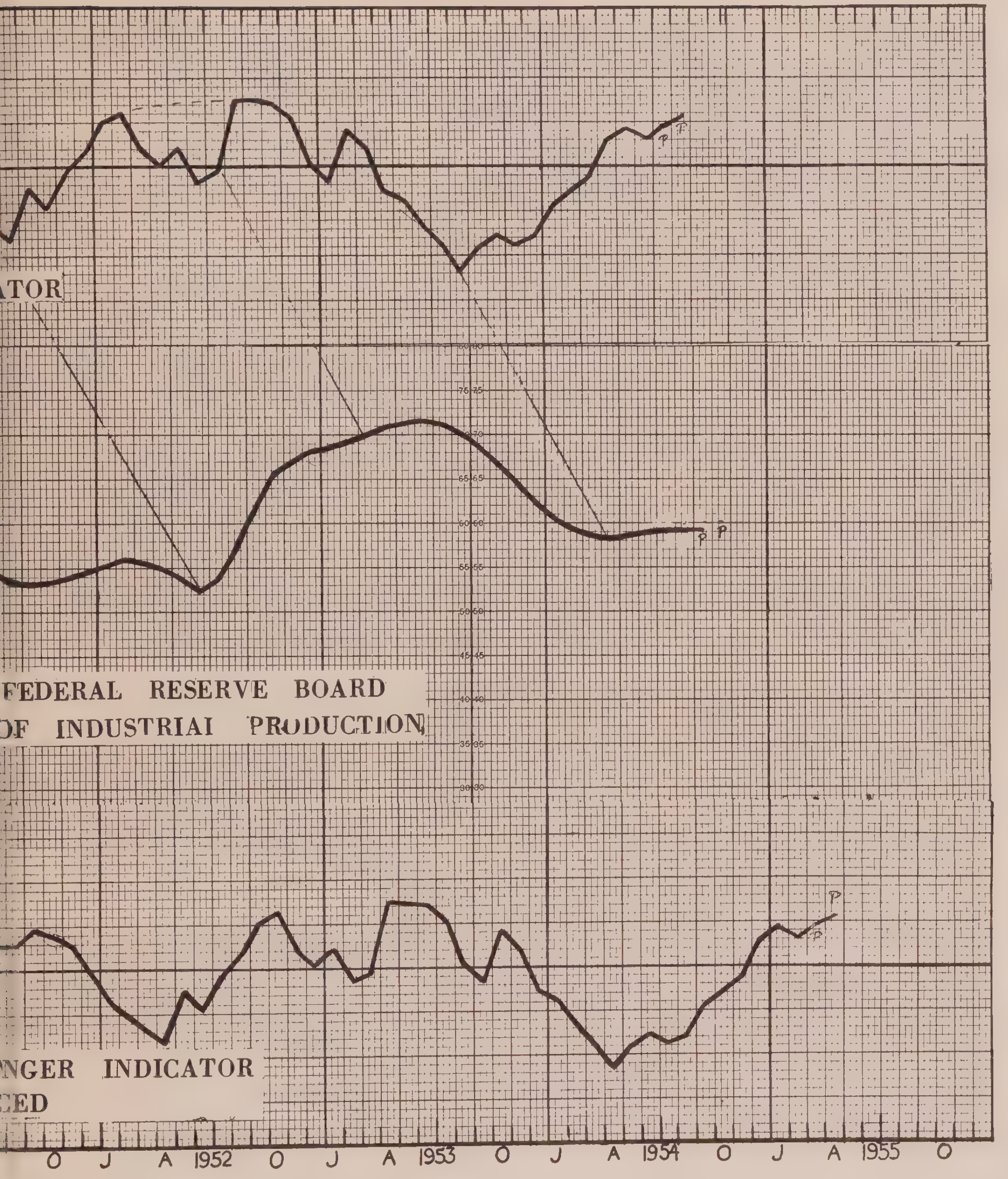


Fig. 1. Curve A. The Modified Geisinger Industrial Production Indicator Curve. This curve is derived from certain figures which are published monthly in the *Survey of Current Business*. It tends to turn about 8 months before the Federal Reserve Board Index of Industrial Production.

Curve B. The Federal Reserve Board Index of Industrial Production adjusted for seasonal variation and smoothed by a 3-month moving average. The value for the latest available month is shown by a dot.

Curve C. This Curve is the Modified Geisinger Industrial Production Indicator Curve advanced by 8 months. This process projects part of the curve into the future. If the relationships of the past continue, the projection gives some hint of what may happen to the Federal Reserve Board Index of Industrial Production (Curve B).

## OF INDUSTRIAL PRODUCTION



## THE FORECAST

The Modified Geisinger Indicator has, in the past, turned about eight months ahead of the Federal Reserve Board Index of Industrial Production.

The Modified Geisinger Indicator turned up in August 1953. This suggested that the F. R. B. Index would turn up in April 1954. It did.

The indicator has resumed its upward trend. It continues to suggest good business for the first quarter of next year, and probably beyond.

*E.R.D.*

# Questions & Answers

*Question:*

Do you think susnpots are the cause of cycles here on earth?

*Answer:*

There seems to be no question but that sunspots and terrestrial magnetism are intimately related. The aurora is also related to sunspot activity. Other than this, as far as I know, no definite interrelationship has yet been proved to the satisfaction of all scientists. On the other hand, many provocative correspondences with weather, with plant and animal life and with human behavior have been pointed out by competent investigators.

*Question:*

In your April 1954 report Dr. and Mrs. Gray show a long cycle in the population of British poets. It seems to figure about 220 years.

Do you know of any other cycles of this length?

*Answer:*

No.

However, I have noticed that many times we find cycles which are 12 times as long as some other cycle. It is interesting that 220 years is just 12 times 18 1/3 years, which is seemingly the length of the main real estate cycle here in the United States.

I do not know if there is a cycle 18 1/3 *months* long, which would be 1/12 of 18 1/3 years, but it would be interesting to investigate.

*Question:*

When and how did you get interested in the subject of cycles?

*Answer:*

In 1932 I had a job which involved trying to find out from the economists why we were having a depression. The economists I talked with could not agree with each other. I lost faith in economics and in economists.

About this time I learned of the behavioristic approach to economics. That is, an approach which asks "How?" instead of "Why." I also learned that when you ask "How" you find that some of the ups and downs come at more or less regular time intervals. To the extent that things behave regularly you have a tool for prediction. Also, if other things behave the same way, you have a clue to cause and effect.

Finally, I discovered that when you study natural phenomena they seem to behave similarly. Then I became really interested. I thought, here is something we *must* find out more about.

*Question:*

Why don't you give us more forecasts?

*Answer:*

I don't know enough!

I know you want forecasts. In fact, I recently had a letter from a man who said, "Please give us more forecasts, even if they are wrong!"

He may be willing to settle for wrong forecasts, but I am not. I *try* to keep within the bounds of what I know.

*Question:*

Where can I buy the *Journal of Cycle Research*? How often does it come out?

*Answer:*

The *Journal of Cycle Research* is issued quarterly. Single copies can be bought for $1. The subscription price has recently been reduced from $5 to $4. You may send subscriptions to the Publication Office, Foundation for the Study of Cycles, 680 West End Avenue, New York 25, New York.

*Question from a student:*

"Lesson I states, 'Time is *always* indicated on a uniform scale. Values for Saturdays and Sundays must be estimated and interpolated.' I understand from the statement that this is so. But I wonder *why*. Why would it not be better, say, in the case of the stock market figures to leave Saturdays and Sundays (and possibly all night-time hours as well) out of the time scale. It would seem to me that since the data are based only on the *working* hours of the Exchange, it would be much more accurate (and possibly even quite revealing to a cycle reader) to plot them on a time scale which accurately portrays the time factors involved. For, after all, *time is only a relative term.*"

*Answer:*

The crux of the matter is this: Are the forces which produce regular significant cycles generated merely by the trading or during trading time, or are they produced irrespective of trading—that is, are they *external* to the trading? If the former, you should ignore time when the exchange is closed. If the latter you should interpolate to account for them.

To illustrate better what I mean, let me tell you of a little game my children used to play when they were young. One would say "Freeze!" whereupon everyone would stay stock still in whatever position he might be—fork halfway to mouth, for example, or one foot upraised—until the child who had said "Freeze!" said "Unfreeze!"

Now imagine a four day cycle in the market with a crest on a particular Tuesday. If it is symmetrical the low would be on Thursday. Friday it would be on the way up. If it is a four *calendar* day cycle it will reach its crest on Saturday, when the market is closed. If, however, it is a four *market* day cycle, it will be as if someone said "Freeze!" as the market closed on Friday and said "Unfreeze!" when the market opened on Monday or Tuesday or whenever. In this event the four day cycle would *not* crest on Saturday. It would be "frozen" and would "unfreeze" on the day the market opened—say Monday.

Now daily cycles in the market *could* behave this latter way. In fact, they *may* behave this way. I do not know. I have not done enough work in daily market cycles to find out. However, I *assume* that they do not.

I assume it because the longer cycles do not seem to immobolize when they suffer a gap. For example, during the war the production of passenger cars was completely suspended. "Freeze!" After the war production was resumed. "Unfreeze!" But the 41-month, 36-month, and *23 2/3-month cycles* in these figures did not freeze. They came back into operation after the war just as if they had been operating in a vacuum all the time the war had been going on. They did *not* pick up where they left off. They picked up where they could have been if they hadn't left off.

Because the longer cycles behave this way I assume they are the result of *external* forces which play upon the human beings involved. By analogy I *assume* that the shorter cycles, about which I know very little, also behave this way. But I may be wrong. (Every man is entitled to his first mistake!)

Shall we put it this way: In the absence of evidence to the contrary, I consider it more *fruitful,* in the first instance, to look for short cycles in the market on a calendar day basis than on a market day basis. However, in final analysis it isn't what *I* think. Nor is it what *you* think. It's what the facts are The only way to settle the matter would be to study the market for cycles on both bases and find out which way turns out to be more productive.

I assume it is self evident that if short daily cycles in the market operate on a calendar day basis you won't be able to find them if you fail to interpolate values for the days the market is closed; and of course vice versa.

Finally, if I am right in thinking that the cyclic forces, like Cascarets, operate "while you sleep," it follows that it would be almost useless to try to find hourly cycles in the market. With the market closed for three quarters of each day as well as on week ends, the job would be well nigh hopeless.

# Letters

### *The 41-Month Cycles in Stocks*

Dear Mr. Dewey:

My special interest in Cycles is in Stock Market, and so I was very much interested in the March number. One point in particular caught my eye--Figure 3, page 109, in which you present a picture that makes it "clear that the 41 months' cycle in Common Stock prices has disappeared."

It is hard for me to accept this statement without a struggle. In the first place, I thought that I had learned that cycles do not fade out. That these rhythms last indefinitely; something may happen to disturb them for a while, but that they come back again. And, certainly there has been a rhythm in stock prices for fifty years, that was not erased in the twenties.

I began to be interested in a possible rhythm some forty years ago. The years from '21 to '32 were very hard to reconcile with the previous years, and I think my interest cooled off until about 1934, when I decided to tackle the problem again; with the result that I felt I could make an allowance for the '21-'32 decade.

Now, we have had a similar period since 1942 or '43 or '44, when extraordinary events - war and taxation, New Deal, Cold War, Korea - blew a hurricane that disturbed the ordinary waves. I think we haven't gotten over it yet. My opinion, which isn't worth anything, is that the cycle is still faintly visible through the smoke, and I expect it to reappear one of these days. I would be very glad to have your comments on what I say.

Very truly yours,

Wilmington, Delaware

### *In Reply I Said:*

Dear Mr.

My statement that the 41-month cycle in Common Stock prices has disappeared is merely a statement of fact. It has disappeared.

This does not mean that it will not come back into the picture again. In fact, on page 108 of our March 1954 report, I said:

"I am more than ever convinced that the 3½-year cycle, which dominated the fluctuations of so many series of figures for so many years, is *not* the result of random forces. I am sure that it is significant."

I went on to say, "On the other hand, I have become equally convinced that these fluctuations are not the result of a simple rhythmic force of the observed length, but rather that they are the result of the interplay of several (probably four) cyclic forces, all of this general order of magnitude. This means that the resultant 3½-year cycle will fade out as the different component cycles pull apart."

The corollary of this statement is that eventually the cycle will reappear, but perhaps with different timing and with different wave length.

I am in the process of studying this cycle as it appears in 170 years of copper prices, in 170 years of pig iron prices, and in over a thousand years of tree rings. Perhaps eventually I will get to the bottom of the mystery.

Ever cordially yours,

### *Source of Data*

Gentlemen:

Please inform me where I may obtain the data (i.e., Stock Market Prices) on which your Stock Market Projection Chart is based. I have in mind the idea of applying a different type of moving "average" to the data—one in which heavier weights are assigned to the more recent prices.

Thank you,

New York, New York

*In Reply I Said:*

Dear Mr.

My stock market projection was based on the cycles I found in the Standard & Poor's Combined Index.

The Standard & Poor's Corporation would doubtless give you a complete set of the figures. They likely have a Los Angeles branch, but if not you can reach them by mail at 345 Hudson Street, New York, New York. The figures are kept up to date in the *Survey of Current Business.*

Cordially yours,

### *A Plan to Measure Cycle Length*

Dear Mr. Dewey:

I understand that serious students of cycles often complain about the lack of availability of data over an extended enough period for determination of accurate cycle length. I am wondering whether this supposed lack of extended data need necessarily retard cycle studies. Would not one possible answer be to spend more time studying extremely short cycles, where the innumerable cycle repetitions, plus careful measurements and calculations, would enable relatively exact determination of cycle length?

For example, it should be relatively simple to amplify an electronic record of a human or animal heart beat and then record it on a continuous belt of accurately pre-ruled paper. The length of the average heart beat could then be relatively easily determined with quite some accuracy. In a few days of recording, I feel confident that enough repetitions would have occurred to make the average length of the heart beat cycle accurately determinable. With this "exact" cycle length available, it should then be possible to prove or disprove *the appealing but somewhat hard-to-swallow theory that if cycles are disturbed, they have some innate compulsion to their original position in time.*

Very truly yours,
J. A. Dorland

New York, New York

*In Reply I Said:*

Dear Mr. Dorland:

It is perfectly true that if you take enough heart beats you can get the average wave length with as much arithmetic accuracy as you desire. But it does not seem to me that you would have anything when you got through except a numerical figure.

I do not think there is any innate compulsion for cycles to snap back to their original position in time, *unless* the particular cycle is caused by some external force of rigid wave length.

Consider, for example, the annual temperature cycle. For three consecutive years this might be 12 months long. The next year might be badly distorted. It might be 14 months long. But, because the cycle length is controlled by a rigid 12-month phenomenon, the next cycle will be about 10 months long and the pattern will get back on the track.

I cannot imagine any external factor governing the length of heart beats.

I do not *know* of any external periodic factor governing the length of economic or biological data except (a) the yearly cycle, (b) the cycle of the moon, and (c) possibly the 11-year sunspot cycle.

However, the length of certain cycles is so regular over so long a period of time that this fact suggests the possibility of unknown periodic forces in our environment. In this connection, consider the lynx cycle of 9.6 years, which has been coming true for more than two centuries. Consider also many other cycles that I have discussed from time to time.

Furthermore, with many of these cycles, when they are distorted they *do* snap back to their original phase. This also suggests an external periodic cause.

It is, of course, possible that all the cycles we observe are like the heart beats. If you had a chart of 20 consecutive heart beats they might look so regular as to suggest an external rhythmic cause--but let a pretty blonde appear!

Incidentally, one should not lump all cycles. Each cycle doubtless has its own cause. Many of these may differ.

In studying cycles we hope eventually to discover for each cycle whether or not it is (a) the result of purely random forces, (b) the result of some inherent internal dynamic force, or (c) the result of some external environmental and presumably astronomical force or forces.

Cordially yours,

# Additions to the Library

"Cycles in Prices, Supplies and Demands for Cattle," by F. A. Pearson, W. I. Myers, and E. E. Vial, *Farm Economics*, Ithaca, New York, No. 193, February 1954, 13 pages 6 tables, 6 figures. Gift of Dr. Pearson.

As Professor Pearson and his associates say in this article, "The cycles in the price, supply and demand for cattle are so pronounced that they are apparent in the actual data and in the data showing departures from normal (figure 1). The supply cycle is the smoothest. There are more irregular fluctuations in price and still more in demand. This indicates that demands and prices are much more sensitive to the constantly changing feed supplies, alternative opportunities and consumer prices than are the numbers of cattle on farms. . .

TABLE 6.—AVERAGES OF THE LENGTHS AND AMPLITUDES OF FOUR CYCLES IN PRICES, DEMANDS AND SUPPLIES OF CATTLE, UNITED STATES, 1893–1949

| Factor | Price | Demand | Supply |
|---|---|---|---|
| *Length of complete cycle, years* | | | |
| Peak to peak | 14 | 14 | 14 |
| Low to low | 13 | 14 | 13 |
| *Length of half of cycle, years* | | | |
| Low to peak | 5 | 6 | 7 |
| Peak to low | 8 | 8 | 7 |
| *Amplitude of cycle* | | | |
| Peak, per cent of normal | 133 | 128 | 112 |
| Low, per cent of normal | 76 | 76 | 89 |
| Per cent peak above low | 81 | 78 | 28 |
| Per cent low below peak | 43 | 40 | 20 |

"When the four completed cycles were averaged, it was found that the demand cycle was 14 years and the supply and price cycles 13 years from low to low (table 6). When measured from peak to peak, each averaged 14 years. The periods of expansion and liquidation in the supply cycle were the same, 7 years. In the case of price and demand the waning side of the cycles took 8 years. This was 2 to 3 years longer than the advance from low to peak.

"An analysis of the amplitude of the cycles indicates that demand fluctuated more than the supply. During periods of expansion demand rose almost three times as much as supply, 78 and 28 per cent, respectively (table 6). When liquidation was underway, the supply declined 20 per cent but demand declined twice as much, 40 per cent. Price, of course, rose and fell more than either demand or supply."

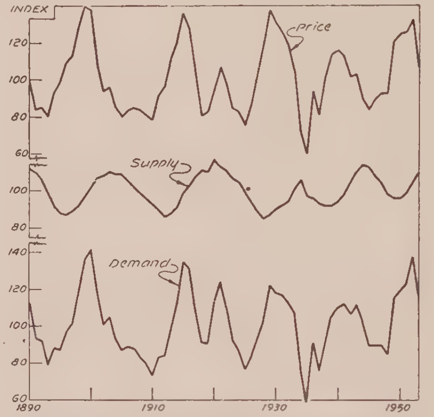


FIGURE 1. CYCLICAL FLUCTUATIONS IN THE REAL FARM PRICE, FARM SUPPLY PER CAPITA AND FARMER DEMAND FOR CATTLE,[4] UNITED STATES, 1890–1953
Normal = 100

Regardless of whether cycles were measured by price, supply or demand or whether they were measured from peak to peak or from low to low, they averaged about 14 years in length.

In attempting to get to the bottom of the cycles involved, Professor Pearson and his associates seem to have had the same troubles as some of the rest of us. They conclude their article with these words:

"This ends three years of intermittent study that is best summarized in the words of famed William Camden, author of famed Britannia and teacher of famed Ben Jonson at Westminister School about 1585: 'What toil is to be taken, no man thinketh, so no man believeth, but he that hath made the trial.' About all that most of us can do in our frustration is to scatter a few facts about and draw complicated charts in the manner of a frustrated child who failed to assemble the myriad pieces of an adult puzzle."

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